PROPOSED REMEDIAL ACTION PLAN
CIRCLE M WOOD TREATING CORPORATION

Town of Fishkill, Dutchess County, New York
Site No. 3-14-083

March 2005

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the Circle M Wood Treating Corporation. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, releases from past lumber treatment process and waste management practices have resulted in the disposal of chromated copper arsenate (CCA) which has constituent elements, chromium, arsenic and copper, that are deemed hazardous at certain concentrations in soil because of their leaching characteristics. The disposal of CCA has contaminated the soil and groundwater at the site. These disposal activities have resulted in:

- a significant threat to human health associated with exposure to contaminated soil; and
- a significant environmental threat associated with the impacts of contaminants to surface soil, subsurface soil and stream sediment.

To eliminate or mitigate these threats, the NYSDEC proposes the following remedy:

- A remedial design program would be developed to provide the details necessary to implement the remedial program.
- Installation and maintenance of an asphalt pavement or two-foot soil cover over the site, as depicted on Figure 6. Further, the slab for the former Circle M Wood Treating Corporation building would be left in place, beneath a proposed "soil consolidation area". Future use of this area would be restricted by an institutional control, as detailed below.
- An erosion control program to stabilize soils with residual contamination on the stream bank, preventing them from washing into the stream. The erosion control would be in the form of grass or other vegetative cover (see Fig. 6).
- Installation of three bedrock monitoring wells (i.e., one upgradient and two downgradient) and one upgradient overburden well.
- Collection and analysis of five sediment samples from the adjacent stream to ensure that remedial construction activities have not resulted in runoff which may have impacted the stream sediments.
- Since the remedy would result in contamination above unrestricted levels remaining at the site, a site management plan (SMP) will be developed and

implemented. The SMP will include the institutional controls and engineering controls to: (a) address any residually contaminated soils that may be excavated from the site during future redevelopment. The plan would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) provide for the operation and maintenance of the components of the remedy; (d) monitor the groundwater, etc. and (e) identify any use restrictions on site development or groundwater use.

- Imposition of an institutional control in form of an environmental easement to include restriction of site useage to industrial, commercial or restricted residential.

- The SMP will require the property owner to provide an Institutional Control/ Engineering Control (IC/EC) certification.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The NYSDEC will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The NYSDEC has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the September 2002 Remedial Investigation (RI) report entitled "Supplemental Remedial Investigation: Circle M Wood Treating Site", the February 2005 Feasibility Study (FS) entitled "Focused Feasibility Study: Circle M Wood Treating Site", and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

1. Howland Public Library
   313 Main St.
   Beacon, NY 12508
   Phone: (845)831-1134
   Hours: M-Th.: 10a.m.-8p.m., Fr/Sa: 10a.m.-5p.m., Su: 1p.m.-5p.m.

2. Town Hall
   Town of Fishkill
   807 Route 52
   Fishkill, NY 12524
   Phone: (845)831-7800
   Hours: M-F, 8:30a.m.-4p.m..

3. NYSDEC- Region 3 Headquarters
   Division of Environmental Remediation
   21 S. Putt Corners Road
   New Paltz, NY 12561-1620
   Phone: (845)256-3154
   Hours: M-F, 8:30a.m.-4:45p.m.
   Contact: John Rashak, Project Manager

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from March 1 to March 30 in order to provide an opportunity for public participation in the remedy

selection process. A public meeting is scheduled for March 14, 2005 at the Fishkill Town Hall beginning at 7PM.

At the meeting, the results of the RI/FS will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. Rashak at the above address through March 30.

The NYSDEC may modify the preferred alternative or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the NYSDEC's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The former Circle M wood treatment facility is located at the end of Brockway Road in the Town of Fishkill, Dutchess County (see Fig. 1). Circle M occupied a 18,500 square foot building which was one of six major buildings (see Fig. 2) located in the 58.6 acre Chelsea Industrial Park. For the purpose of this PRAP, the site is defined as a 21 acre area (see Fig. 6). The site is approximately 0.25 miles east of the Hudson River at an elevation of 55 feet above mean sea level, and 50 feet above the Hudson River mean water level. An unnamed stream flowing north, and located about 100 feet away from the Circle M building, forms the eastern boundary of the site. Across the stream, and extending from the north to the southeast, are residential properties (see Fig. 3). The facilities at the site and most of the nearby residences are supplied with public water from off-site wells operated by the Rombout Water District. However, two private wells are reported to be within a quarter mile radius, up gradient and northeast of the site.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The Circle M wood treatment facility operated from 1986 to 1990. The facility treated wood by impregnating it with chromated copper arsenate (CCA) as a preservative. Improper operational and waste management practices resulted in spills and drippage of CCA during the 1986-1990 period both indoors (from storage tanks, the treatment process, and associated piping) and outdoors (from storage of fresh batches of incompletely dried treated lumber). Metals arsenic (As), chromium (Cr) and copper (Cu) form the principal constituents of CCA. Circle M vacated the property in early 1990.

3.2: Remedial History

In 1986, Circle M was cited by the NYSDEC for Resource Conservation and Recovery Act (RCRA) violations, including the improper storage of treated wood.

The Potentially Responsible Party (PRP) is the owner of the Chelsea Industrial Park, which encompasses the site. In the period 1987-1989, the owners consultants conducted two investigations and site assessments, and provided the PRP with two reports dated September 1987 and January 1989.

The site was placed on the Registry of Inactive Hazardous Waste Disposal Sites in New York as a Class 2 site in 1990, based on analytical data collected. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

In the spring of 1990, during the repossession of leased equipment by the supplier, an accidental spill of approximately 3,000 gallons of CCA occurred, which was cleaned up by a NYSDEC spill contractor. Six months later, during an

inspection of frozen pipes, another spill of approximately 1,600 gallons of CCA was discovered and also cleaned up by a NYSDEC spill contractor.

Between 1990 and 1997, several other removal activities were conducted at the site by the PRP. These included the removal and recycling of 256 drums of liquid waste and 18,000 gallons of liquid waste stored in tanks on site.

The above on-site removal activities and subsequent regrading have altered the characterization of the extent of contamination defined by the data collected during the investigations in 1987 and 1989. Therefore, no further consideration will be given to the data obtained from these investigations, except for the metals concentrations data for the background soil samples collected from off-site locations, since these were areas were not disturbed by Circle M activities. Investigations reports listed in Section 5.1 below provide more reliable data for the assessment of contamination on-site.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The NYSDEC, Chelsea Industrial Park Inc. and Chemical Specialties Inc. entered into a Consent Order on June 27, 1997. The Order obligates the responsible parties to implement a Focused RI/FS remedial program. Upon issuance of the ROD the NYSDEC will approach the PRPs to implement the selected remedy under an Order on Consent.

SECTION 5: SITE CONTAMINATION

A focused remedial investigation/feasibility study (FRI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between September 1997 and September 2002. The field activities and findings of the investigation are described in the September 2002 RI report entitled "Supplemental Remedial Investigation: Circle M Wood Treating Site", along with these four additional reports and the two aforementioned site assessments identified in Section 3.2:

- The September 9, 1998 RI report;
- An October 1999 report entitled "Biological Resource Inventory and Impact Assessment";
- The October 1999 FS report; and
- A July 2001 Supplemental RI report.

The following activities were conducted during the RI:

- February, 1998: Sampled the stream sediment at three points , as well as the groundwater in six monitoring wells for the metals As, Cr, and Cu;
- April, 1998: Resampled the groundwater in monitoring wells MW-1, 3, and 7 for metals;
- January, 1999: Completed Geoprobe borings to a depth of 6 feet and sampled in 2-foot intervals. In addition, six surface soil samples were taken in the 0-0.5 foot range and analyzed for the same three metals;
- March, 2001: Collected 12 soil samples at six locations. The samples were taken from the 0-4 inch and 8-12 inch depth ranges, and analyzed for As, Cr, and Cu;
- May-June, 2001: Took two additional sediment samples and five surface water

samples from the unnamed stream on the eastern border of the site. In addition, completed Geoprobe borings along with monitoring well MW-8. The geoprobes were completed to a depth of 2 feet and sampled in 6-inch intervals for As, Cr, and Cu. A total of 53 soil samples and seven groundwater samples were collected and analyzed during this period;

- February, 2002: Completed an additional 33 Geoprobe borings to a depth of 2 feet; and sampled in 6-inch intervals for As, Cr and Cu. A total of 142 soil samples were collected and analyzed; and

- April, 2002: Completed 10 more Geoprobe borings to a depth of 2 feet; and sampled in 6-inch intervals for As, Cr, and Cu. A total of 44 soil samples were collected and analyzed.

To determine whether the soil and groundwater contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water and surface water SCGs are based on NYSDEC "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code;

- Soil SCGs, to be used in conjunction with the NYSDOH human health exposure assessment in Section 5.3, are based on the NYSDEC "Technical and Administrative Guidance Memorandum (TAGM) 4046, Determination of Soil Cleanup Objectives and Cleanup Levels"; and in this case take into account the site-related background levels. The remedial objectives selected for this site are 13 ppm, 25 ppm and 25 ppm, for arsenic, chromium and copper, respectively; and

- Sediment SCGs, to be used in conjunction with the environmental impact assessment in Section 5.4, are based on the NYSDEC "Technical Guidance for Screening Contaminated Sediments."

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the RI report.

5.1.1: Site Geology and Hydrogeology

The site soils are characterized by thick lacustrine deposits of silt and clay overlain by 2 to 8 feet of gravel/fill. The groundwater flow direction in the overburden soil is east-northeast (see Fig. 5). The depth to the groundwater table, allowing for seasonal changes and topography, ranges from 4-11 feet below the ground surface and is in the silt/clay layer. The well log indicates that shale was encountered at a depth of 6 feet below ground surface in some locations. Based upon the available data, rate of lateral and downward flow of groundwater, and consequently the rate of transport of contaminants, would be low.

5.1.2: Nature of Contamination

As described in the RI report, many soil, groundwater, surface water, and sediment samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are As, Cr, Cu which are the constituents of CCA, the chemical used by Circle M as a wood preservative.

5.1.3: Extent of Contamination

This section describes the findings of the investigation for all environmental media investigated.

Between 1990 and 1997 a number of waste removal activities were conducted at the site

because of accidental spills. There may also have been unreported grading activities at the site. These activities may have affected the validity of the soil data collected during the 1987-89 time frame. Therefore, this evaluation will focus on a comparison of the more recent RI data to the relevant SCGs.

Table 1 summarizes the degree of contamination for the contaminants of concern (i.e., the heavy metals As, Cr, and Cu) in surface soil (top six inches), subsurface soil, sediment, groundwater, and surface water. The following are the media which were investigated and a summary of the findings of the investigation.

Chemical concentrations are reported in parts per billion (ppb) for water, and parts per million (ppm) for soil and sediment. For comparison purposes, where applicable, SCGs are provided for each medium.

Surface Soil

The locations of the highest contaminant concentrations in surface soil (up to 0.5 feet in depth) are as follows: For As at 557 ppm at sample GB-13 (Fig. 4) under the building; for Cr at 326 ppm at GB-40, which is located northeast of the Circle M building and 100 feet west of stream, and Cu at 296 ppm at GB-40. Elsewhere on site the contamination concentrations are at lower levels.

Subsurface Soil

The location of the highest contaminant concentrations at depths greater than six inches is at location GB-14 which is under the building (see Fig. 4) and the concentrations are as follows: As at 505 ppm, Cr at 1225 ppm and Cu at 665 ppm. Elsewhere on site, the locations where the contaminant concentrations exceed the background concentrations, as described in the "Background Soils" section above, are generally spread over the areas to the south of the building, between the building and the stream to its east (which includes the drip pad used for drying freshly treated lumber), and in three isolated areas shown in Fig. 6. The maximum concentrations of As, Cr and Cu outside the building are 230, 179, and 207 ppm, respectively, at location GB-40.

Sediment

Three sediment samples were analyzed in the February 1998 and two in June 2001 (see Table 1). The only exceedence of the Severe Effects Level (SEL) was for As. S2, located about 100 feet south of location M, exceeded the SEL of 33 ppm for As at 47.8 ppm.

Groundwater

The groundwater quality data collected from the seven shallow monitoring wells at the site serve to assess the nature and extent of contamination in the shallow saturated zone. The results of unfiltered groundwater sample analysis provide an assessment of the suspended and dissolved metals in the sample, whereas the filtered sample analysis was conducted to quantify only the dissolved metals. The dissolved fraction better represents the potential for transport of contaminants with groundwater flow. Several factors can affect the unfiltered sample results including the design and construction of the well, the fineness of the soil particles, their propensity to adsorb the metals, and the fine-grained particles that increase turbidity before sampling and the propensity of fine particles to increase turbidity.

The results of 26 groundwater samples collected from seven monitoring wells are summarized in Table 1. The depths of the seven existing overburden wells at the site range from 17-24 feet. Groundwater is in the range of 4-11 feet below ground surface.

None of the filtered samples analyzed during the RI exceeded the SCGs. The unfiltered results varied widely however. For example, monitoring well MW-1 had the highest concentrations. MW-1 had 1,430 ppb of Cu in the February 1998 sample, 575 ppb in the April 1998 sample and 292 ppb in the June 2001 sample. MW-1 is located

immediately west of the Circle M building. The concentration of As and Cr in samples analyzed in June 2001 from MW-1 were 24 ppb and 161 ppb, respectively. The groundwater standards for As, Cr and Cu are 25, 50 and 200 respectively. MW-1 has, among all the overburden wells, the shallowest depth to the groundwater table at about 4-5 feet below ground surface. It also has the highest groundwater table elevation. The set of unfiltered sample results is insufficient to conclusively determine the concentration trends in MW-1.

Surface Water

Five surface water samples were collected during the RI . The surface water contamination that exceeds the SCG is limited to copper. The range of copper concentrations in the stream were was 37-48 ppb. The SCG for copper was is 9 ppb. Since copper was recorded above the SCG in the furthest upstream sample, ST-1, at 43 ppb, the copper contamination in the stream is not considered to be site-related. Rather, the copper contamination in the stream is considered to be due either to a naturally high background level, or another upstream source.

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

An IRM was conducted at the site during the latter part of the RI/FS, in which two abandoned underground storage tanks were excavated and removed from the site. The soil in the footprints of the excavated tanks were removed and disposed of offsite as appropriate. In addition, as described in Remedial History Section 3.2, several spill removal actions were conducted by the NYSDEC between 1990 and 1997.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 5.3 and Table 1 of the FS report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway are documented. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

The following potential exposure pathways relate to on-site soils:

- Incidental ingestion of and/or dermal contact with on-site soils is a potential pathway if these soils are not covered or removed; and
- Inhalation of particulates should the site be subject to invasive (e.g., excavation) activities.

5.4: Summary of Environmental Impacts

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The October, 1999 "Biological Resource Inventory and Impact Assessment" prepared for this site presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors. The following environmental exposure pathways and ecological risks have been identified:

- The potential impact of contaminated sediment on the flora and fauna in the unnamed stream on the eastern border of the site.

In 1999, a qualitative examination of the stream showed that the macroinvertebrate composition was similar to that in a nearby, uncontaminated reference stream, indicating that there were no significant impacts from the site.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- Exposures of persons at or around the site to As, Cr, and Cu in soil and groundwater;
- Environmental exposures of flora or fauna to As, Cr, and Cu in sediment;
- The release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards; and
- The release of contaminants from surface soil into air through wind borne dust.

Further, the remediation goals for the site include attaining to the extent practicable:

- TAGM 4046 objectives which in this case take into account the site related background levels for arsenic, chromium and copper of 13 ppm, 25 ppm and 25 ppm, respectively.
- Groundwater SCGs based on NYSDEC "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Circle M site were identified, screened and evaluated in the December 16, 2002 report entitled "Focused Feasibility Study: Circle M Wood Treating Site" which is available at the document repositories mentioned previously.

A summary of the remedial alternatives that were considered for this site are discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of

30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The potential remedies are intended to address the contaminated soil and groundwater at the site.

Alternative 1: No Action (Except Monitoring of Seven Existing On-Site Wells)

Present Worth: $122,980
Capital Cost: $8,000
Annual OM&M: $8,000

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Alternative 2: Asphalt Pavement/Soil Cover; Implementation of an Erosion Control Program for Stream Protection; Installation of Three Bedrock Monitoring Wells and Implementation of Deed Restrictions

Present Worth: $2,987,500
Capital Cost: $2,153,225
Annual OM&M: $61,750

Under Alternative 2, an asphalt pavement/soil cover would be placed in the area outlined in Fig. 6. The extent of the asphalt area was determined after due consideration of the SCGs for As, Cr and Cu, the health and environmental exposure assessments, the intended long term use of the site and the institutional controls that will would be put in place. A demarcation barrier would be placed underneath the asphalt pavement. The slab underneath the former Circle M Wood Treating Corporation building would be left in place beneath the proposed soil consolidation area. Also, for the streambank, an erosion control program would be implemented to prevent uncovered soil from washing into the stream. The erosion control would be in the form of grass or other vegetative cover. The control is needed because the SCGs for the metals of concern in the sediment are lower than the concentrations of metals in the soil that would be left uncovered between the Circle M building and the stream.

In addition, three bedrock wells (two upgradient and one downgradient) and a shallow upgradient well would be installed. There are six former Rombout Water District supply wells near the site that were abandoned, reportedly due to non-site related problems. The new bedrock wells on site would serve as sentinel wells to warn of any potential impacts to a future re-commissioning of the abandoned wells, or installation and use of new supply wells nearby. The upgradient shallow well would enable a better assessment of the impact on the shallow groundwater at the site. The three new bedrock wells and one shallow well, and the existing seven shallow wells, would be sampled after the completion of the remedial action and thereafter as determined by the site Operation, Maintenance and Monitoring Plan. Sediment samples from five locations in the stream bed would be sampled once after the construction of the asphalt pavement and the placement of the vegetative cover, and the results would be evaluated by the NYSDEC and NYSDOH to determine the need for additional investigation or corrective action.

This alternative would include the installation and maintenance of an asphalt pavement (Fig. 7) or two-foot soil cover to cover any part of the area delineated in Fig. 6 (including the proposed soil consolidation area) that will not be covered by a road, building, or other equivalent cover. Institutional controls, with the following elements, would be put in place: the installation and maintenance of an asphalt pavement or two-foot soil cover over the site, as depicted on Figure 6. Further, the slab for the former Circle M Wood Treating Corporation building would be left in

place, beneath a proposed "soil consolidation area". Future use of this area would be restricted by an institutional control, as detailed below.

- A soils management plan would be developed to address residual contaminated soils that may be excavated from the site during future redevelopment. The plan would require soil characterization and where applicable, disposal/reuse in accordance with NYSDEC regulations.

- Institutional controls, in the form of an environmental easement, would be implemented to limit future site development and prevent future exposures to site contaminants. These will include: (a) a site use restriction limiting future uses to commercial, industrial, or restricted residential as specified by the NYSDEC and the NYSDOH; (b) worker notification if utility or other excavation work below the demarcation barrier is planned; (c) notification to the NYSDEC prior to any action which could jeopardize the integrity of the remedy; (d) development and approval of a soil management plan for any soil or waste removed from below the demarcation barrier, and (e) prohibition of the development of water supply wells on the site property.

- The property owner would be required to provide an IC/EC certification. This would be prepared and submitted by a professional engineer or environmental professional acceptable to the NYSDEC Department, annually or for a period to be approved by the NYSDEC. This document would certify that the institutional controls and engineering controls put in place, are unchanged from the previous certification and nothing has occurred that would impair the ability of the control to protect public health or the environment or constitute a violation or failure to comply with any operation an maintenance or soil management plan.

Alternative 3: Excavation and Off-Site Disposal (Excluding Sub-Floor Soil); Implementation of an Erosion Control Program for Stream Protection; Installation of Three Bedrock Monitoring Wells and Implementation of Deed Restrictions

Present Worth: *$19,873,000*
Capital Cost: *$19,038,760*
Annual OM&M: $61,750

Under Alternative 3, the area outlined in **Fig. 6,** excluding that under existing structures, instead of being covered would be excavated and disposed off-site at a permitted disposal facility. The volume of soil that would be removed is estimated to be 36,000 cubic yards. All other provisions of Alternative 2 would apply.

Alternative 4: In-Situ Soil Treatment; Implementation of an Erosion Control Program for Stream Protection; Installation of Three Bedrock Monitoring Wells; and Implementation of Deed Restrictions

Present Worth: *$4,491,800*
Capital Cost: *$3,657,500*
Annual OM&M: $61,750

Under Alternative 4, in-situ soil treatment would be used for all soil in the area outlined in Fig. 6, except for soil underneath existing structures, instead of being covered as in Alternate 2 . All other provisions of Alternative 2 would apply.

In-situ soil treatment would consist of one or more of four soil treatment technologies. These technologies include electrokinetic remediation, phytoremediation, soil flushing and solidification/stabilization. Pilot testing would be needed to determine the appropriate in-situ treatment.

Alternative 5: Asphalt Pavement; Sub-Floor Soil Excavation and Off-Site Disposal;

Implementation of an Erosion Control for Stream Protection; Installation of Three Bedrock Monitoring Wells; Institution of a Groundwater, Surface Water, and Sediment Monitoring Program; and Implementation of Deed Restrictions

Present Worth: *$4,192,000*
Capital Cost: *$3,357,800*
Annual OM&M: $61,750

Under Alternative 5, the soil underneath the Circle M building identified in Fig. 6 would be excavated and disposed of off-site and the floor slab would be reinstated. All provisions of Alternative 2 would also apply.

Alternative 6: Excavation and Off-Site Disposal (Including Sub-Floor Soil); Implementation of an Erosion Control Program for Stream Protection; Installation of Three Bedrock Monitoring Wells; and Implementation of Deed Restrictions

Present Worth: *$21,075,000*
Capital Cost: *$20,240,800*
Annual OM&M: $61,750

Under Alternative 6, the area outlined in Fig. 6 would be excavated, including the soil underneath the Circle M building, but not including the soil underneath any other existing structures and the floor slab would be reinstated. Apart from the cover, all other provisions of Alternative 2 would apply.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York State. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to

monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectiveness. Capital costs and operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the NYSDEC will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The NYSDEC is proposing Alternative 2 as the remedy for this site. Alternative 2 requires the construction and maintenance of an asphalt pavement covering areas of the site as shown in Fig. 6. The extent of the asphalted area was determined after due consideration of the SCGs and site background levels for As, Cr and Cu, the intended long term use of the site as restricted residential and the institutional controls that would be put in place. Restricted residential use would allow for residential development only where there would be common control of the property such as apartment complexes, townhouse developments, mixed use high rise development or condominium developments, etc. In addition, vegetable gardens would only be allowed on a property, in the form of community gardens, which may be considered with NYSDEC Department approval.

Alternative 2 would include: a demarcation layer placed underneath the asphalt pavement or two-foot soil cap to identify contaminated soil from the material used for the site cover; installation of three bedrock wells (two upgradient and one downgradient); an erosion control program in the form of grass or other vegetative cover, to stabilize soils with residual contamination on the stream bank; sampling of the monitoring wells and stream sediment; development of a soil management plan; and implementation of institutional controls.

The proposed remedy is based on the results of the RI and the evaluation of alternatives presented in the FS. Alternative 2 is being proposed because, as described below, it would satisfy the threshold criteria and would provide the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site by covering the soils that create the most significant threat to public health and the environment, which would also greatly reduce the source of contamination to groundwater. Alternatives 3, 4, 5, and 6 would also comply with the threshold selection criteria, but at a higher cost or (in the case of Alternative 4) with lower certainty.

Because Alternatives 2, 3, 4, 5, and 6 satisfy the threshold criteria, the five balancing criteria are particularly important in selecting a final remedy for the site.

Alternatives 2 (capping), 3 (excavation, excluding Circle M building footprint), 4 (in-situ soil treatment), 5 (capping and Circle M building footprint excavation), and 6 (excavation, including Circle M building footprint) all have

short-term impacts which can easily be controlled. The time needed to achieve the remediation goals are comparable for all alternatives.

Achieving long-term effectiveness would best be accomplished by excavation and removal of the contaminated overburden soils (Alternatives 3 and 6). However, the cost of these alternatives would be 4-5 times that for alternatives 2, 4, and 5. Alternative 2 would be favorable because it would result in the capping of all contaminated soil at the site that significantly exceeds exceeds the site-cleanup goals for any of the metals of concern, and would cost $500,000-1,200,000 less than Alternatives 4 and 5 for similar protection.

The pilot-testing required for Alternative 4 would resolve the question of its long-term effectiveness. The other alternatives would have no question as to their long-term effectiveness, especially since the effectiveness of the capping required by Alternatives 2 and 5 would be maintained by an environmental easement.

Alternatives 6, 3, and 5 would reduce the volume of waste on-site, in that order (i.e., 60,000, 54,000, and 6,000 tons, respectively). However, Alternative 2 would cover the contaminated soil with asphalt pavement, while Alternative 4 would attempt to stabilize the contamination with an in-situ soil treatment process.

All alternatives would reduce the mobility of the contaminants, although the long-term effectiveness of Alternative 4 would have to be proved via pilot-testing.

The cost of the alternatives varies significantly (i.e.,$2,266,000-10,851,000). However, Alternative 2 would be the least expensive remedy, and would provide effective protection of public health and the environment.

The estimated present worth cost to implement the remedy would be $2,266,000. The cost to construct the remedy is estimated to be $2,221,000 and the estimated average annual operation, maintenance, and monitoring costs for four or more years is $10,000.

The elements of the proposed remedy would be as follows:

1. A remedial design phase would be carried out to provide the details necessary for the construction and implementation of the remedy. This may include pre-design investigation to determine the extent of the area to be capped or excavated.

2. Installation and maintenance of an asphalt pavement or two-foot soil cover over the site, as depicted on Figure 6. Further, the slab for the former Circle M Wood Treating Corporation building would be left in place, beneath a proposed "soil consolidation area". Future use of this area would be restricted by an institutional control, as detailed below;

2. Installation and maintenance of an asphalt pavement (Fig. 7) or two-foot soil or equivalent cover to cover areas (including the proposed soil consolidation area shown in Fig. 6) with concentrations of arsenic, chromium, or copper that exceed the remedial goals; a demarcation layer would be included in areas of soil cover to identify when the cover has been breached. The slab underneath the former Circle M Wood Treating Corporation building would be left in place beneath the proposed soil consolidation area. The soil used for the cover will would be of a quality consistent with the relevant SCGs and with the use of the site for restricted residential purposes.

3. Implementation of erosion controls to stabilize soils with residual contamination on the stream bank, preventing them from washing into the stream. The erosion control would be in the form of grass or other vegetative ground cover (see Fig. 6).

4. Installation of three bedrock monitoring wells, one upgradient and two downgradient and one upgradient overburden well. The four new and seven existing monitoring wells would be monitored as part of the site management plan.

5. Collection and analysis of five sediment samples from the stream to ensure that remedial construction activities would not result have not resulted in runoff which may have impacted would impact the stream sediments. Sample results would be evaluated by the NYSDEC and the NYSDOH to determine the need for additional investigation or corrective action based on potential for exposure under the restricted residential use criteria.

6. Since the remedy results in contamination above unrestricted levels remaining at the site, a site management plan (SMP) would be developed and implemented. The SMP would include the institutional controls and engineering controls to:(a) address residual contaminated soils that may be excavated from the site during future redevelopment. The plan would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) provide for the operation and maintenance of the components of the remedy; (d) monitor the groundwater, etc. and (e) identify any use restrictions on site development or groundwater use.

7. Imposition of an institutional control in form of an environmental easement that would: (a) require compliance with the approved site management plan, (b) limit the use and development of the property to commercial, industrial or restricted residential uses, subject to approval by NYSDEC and NYSDOH; (c) restrict use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Dutchess County Department of Health; and, (d) require the property owner to complete and submit to the NYSDEC an Institutional Control/ Engineering Control (IC/EC) certification.

8. The SMP would require the property owner to provide an IC/EC certification, prepared and submitted by a professional engineer or environmental professional acceptable to the Department annually or for a period to be approved by the NYSDEC, which would certify that the institutional controls and engineering controls put in place, are unchanged from the previous certification and nothing has occurred that would impair the ability of the control to protect public health or the environment or constitute a violation or failure to comply with any operation and maintenance or soil management plan.

TABLE 1
Nature and Extent of Contamination
September 1998- September 2002

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)	SCG (ppm)	Frequency of Exceeding SCG
Inorganic Compounds	Arsenic	0.31-557	13	37 out of 81
	Chromium	4.27-326	25	35 out of 81
	Copper	4.93-296	25	62 out of 81

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)	SCG (ppm[a])	Frequency of Exceeding SCG
Inorganic Compounds	Arsenic	0.36-505	13	39 out of 212
	Chromium	2.12-1,225	25	30 out of 212
	Copper	3.85-665	25	119 out of 212

SEDIMENTS	Contaminants of Concern	Concentration Range Detected (ppm)	SCG (ppm)	Frequency of Exceeding SCG
Inorganic Compounds	Arsenic	1.24-47.8	LEL - 6	4 out of 5
			SEL - 33	1 out of 5
	Chromium	11.1-32.6	LEL - 26	1 out of 5
			SEL -110	0 out of 5
	Copper	15.0-34.1	LEL - 16	4 out of 5
			SEL -110	0 out of 5

TABLE 1 (continued)
Nature and Extent of Contamination
September 1998- September 2002

GROUNDWATER (Unfiltered samples)	Contaminants of Concern	Concentration Range Detected (ppb)	SCG (ppb)	Frequency of Exceeding SCG
Inorganic Compounds	Arsenic	2.1-284	25	5 out of 16
	Chromium	4.2-236	50	7 out of 16
	Copper	4.8-1,430	200	4 out of 16

GROUNDWATER (Filtered samples)	Contaminants of Concern	Concentration Range Detected (ppb)	SCG (ppb)	Frequency of Exceeding SCG
Inorganic Compounds	Arsenic	2.1-22	25	0 out of 10
	Chromium	4.2-14	50	0 out of 10
	Copper	9.6-49	200	0 out of 10

SURFACE WATER	Contaminants of Concern	Concentration Range Detected (ppb)	SCG (ppb)	Frequency of Exceeding SCG
Inorganic Compounds	Arsenic	0-5	150	0 out of 5
	Chromium	0-10	74	0 out of 5
	Copper	37-48	9	5 out of 5

ppb = parts per billion, which is equivalent to micrograms per liter (ug/L) in water.

ppm = parts per million, which is equivalent to milligrams per kilogram (mg/kg) in soil.

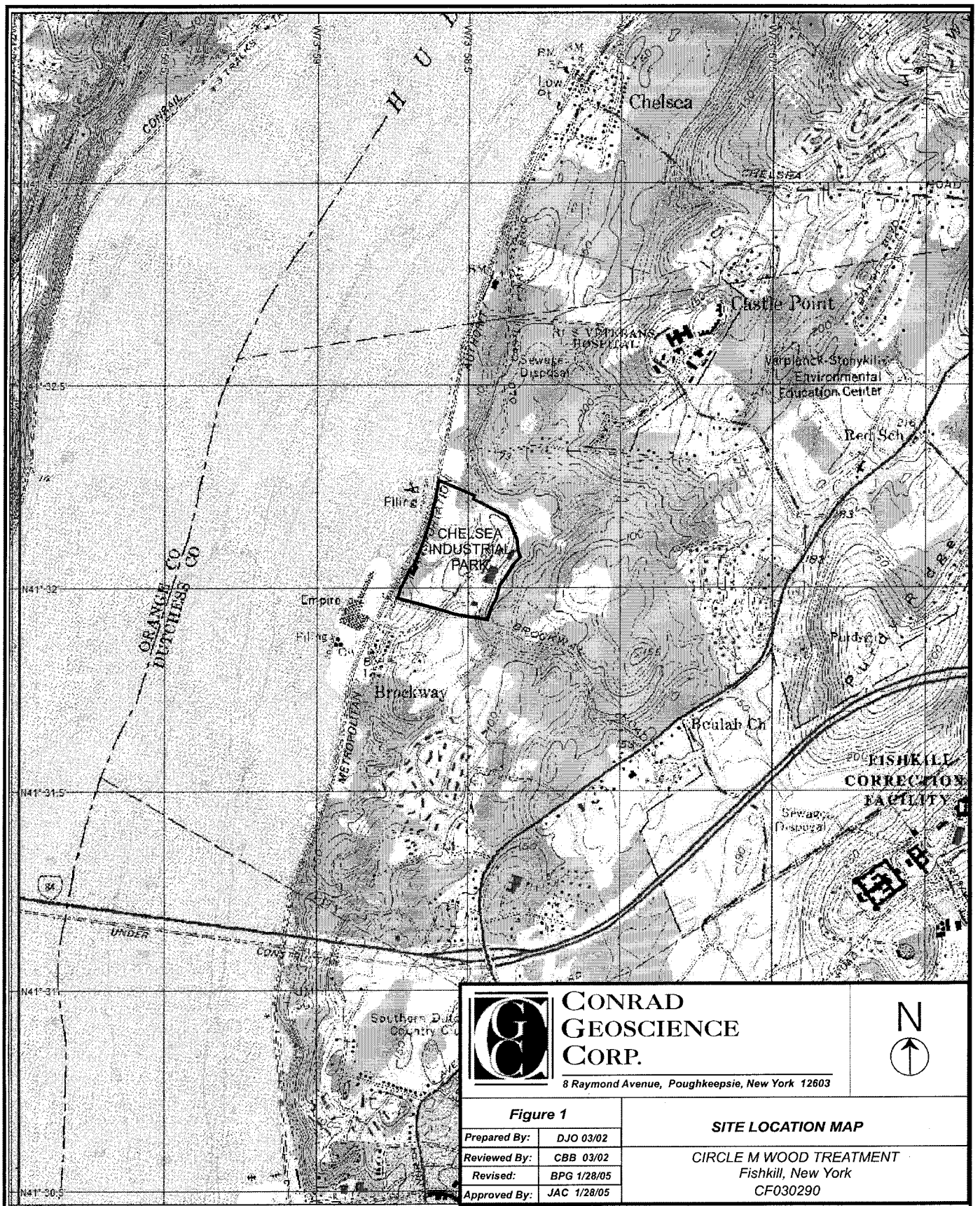
SCG = standards, criteria, and guidance values based on unrestricted use.

LEL = Lowest Effects Level and SEL = Severe Effects Level. A sediment is considered to be contaminated if either of these criteria is exceeded. If both criteria are exceeded, the sediment is severely impacted. If only the LEL is exceeded, the impact is considered to be moderate.

Note: The SCG values are to be used with due consideration to the health and environmental exposure assessments in Sections 5.3 and 5.4 of this PRAP.

TABLE 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth
No Action	$8,000	$8,000	$122,980
Low Permeability Capping	$2,153,225	$61,750	$2,987,500
Excavation and Off-Site Disposal (Excluding Sub-Floor Soil)	$19,038,760	$61,750	$19,873,000
In-Situ Soil Treatment	$3,657,500	$61,750	$4,491,800
Low Permeability Capping, Sub-Floor Soil Excavation and Off-Site Disposal	$3,357,800	$61,750	$4,192,000
Excavation and Off-Site Disposal (Including Sub-Floor Soil)	$20,240,800	$61,750	$21,075,000



CONRAD GEOSCIENCE CORP.

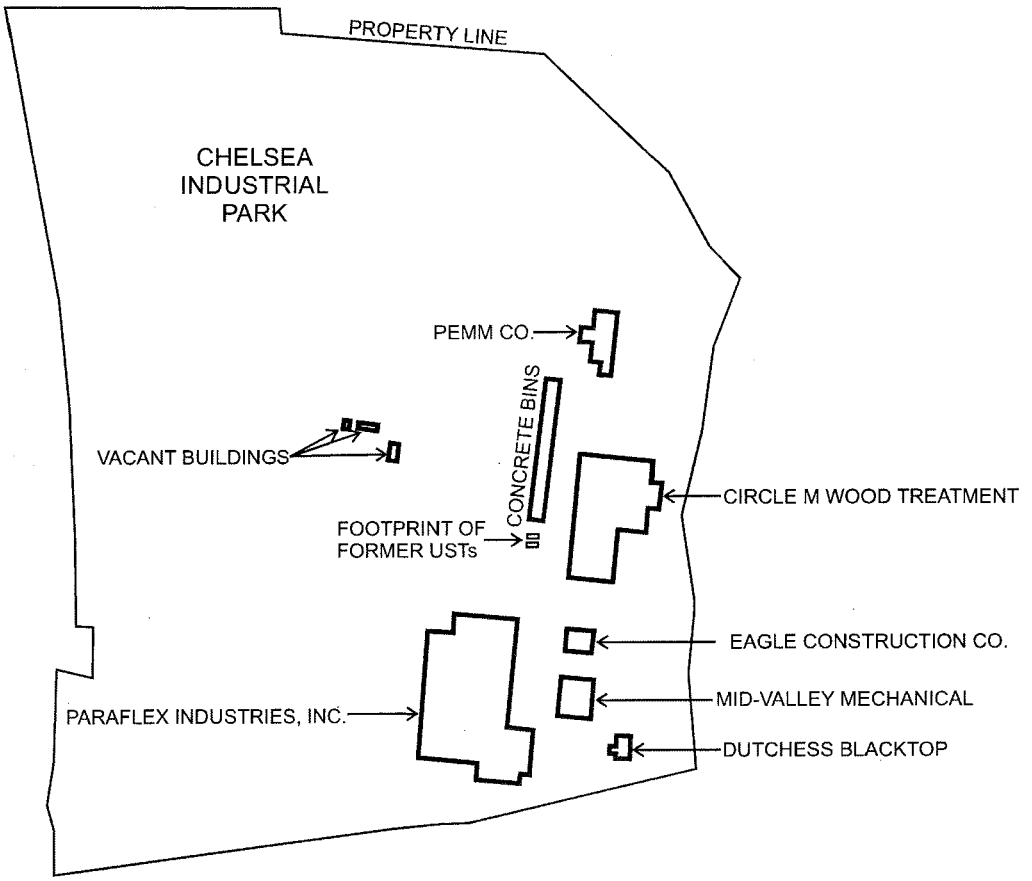
8 Raymond Avenue, Poughkeepsie, New York 12603

N

Figure 1	
Prepared By:	DJO 03/02
Reviewed By:	CBB 03/02
Revised:	BPG 1/28/05
Approved By:	JAC 1/28/05

SITE LOCATION MAP

CIRCLE M WOOD TREATMENT
Fishkill, New York
CF030290



0 FEET 200

100

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N

Figure 2		ONSITE STRUCTURES
Prepared By:	DJO 03/02	
Reviewed By:	CBB 03/02	CIRCLE M WOOD TREATMENT
Revised:	BPG 1/28/05	Fishkill, New York
Approved By:	JAC 1/28/05	CF030290

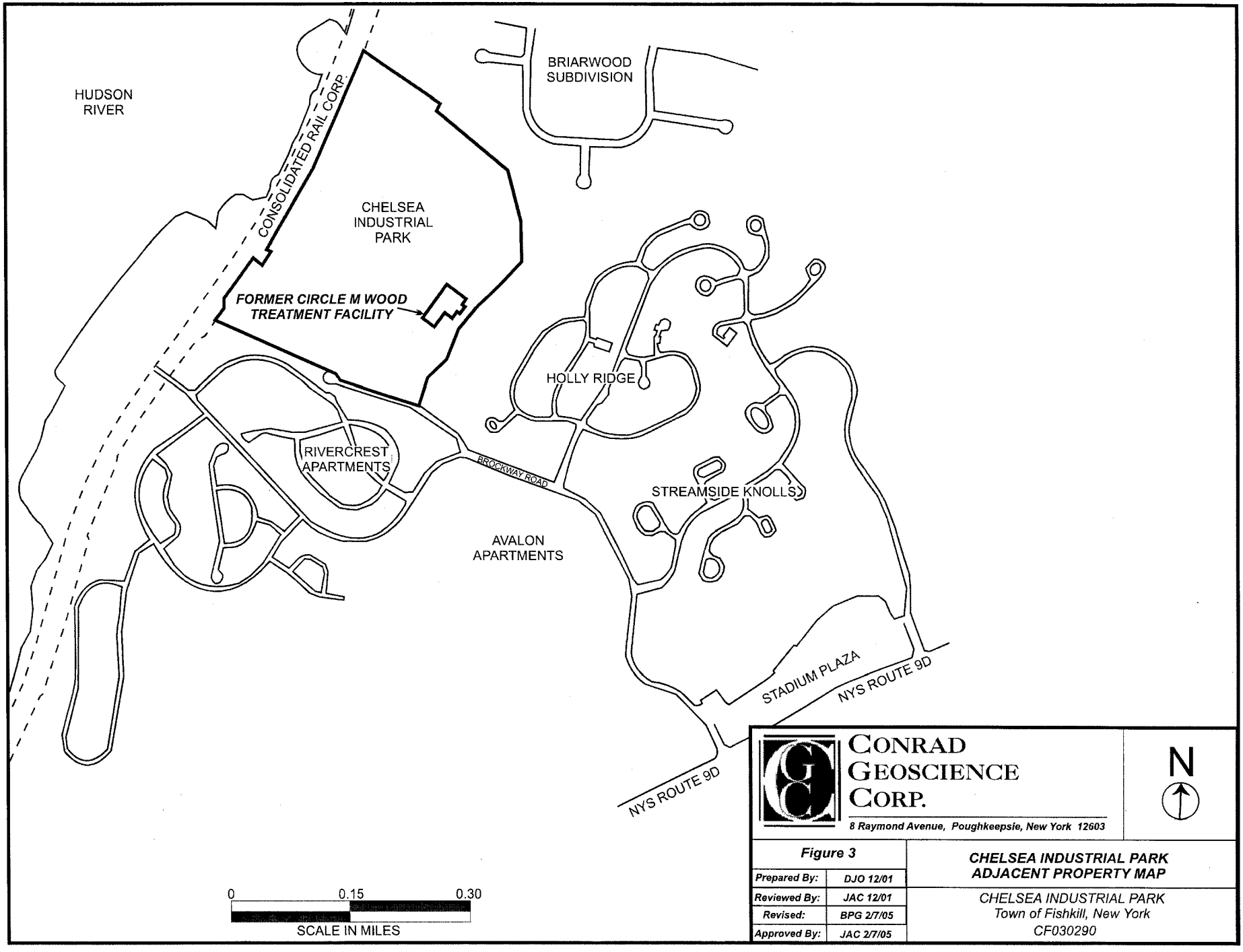

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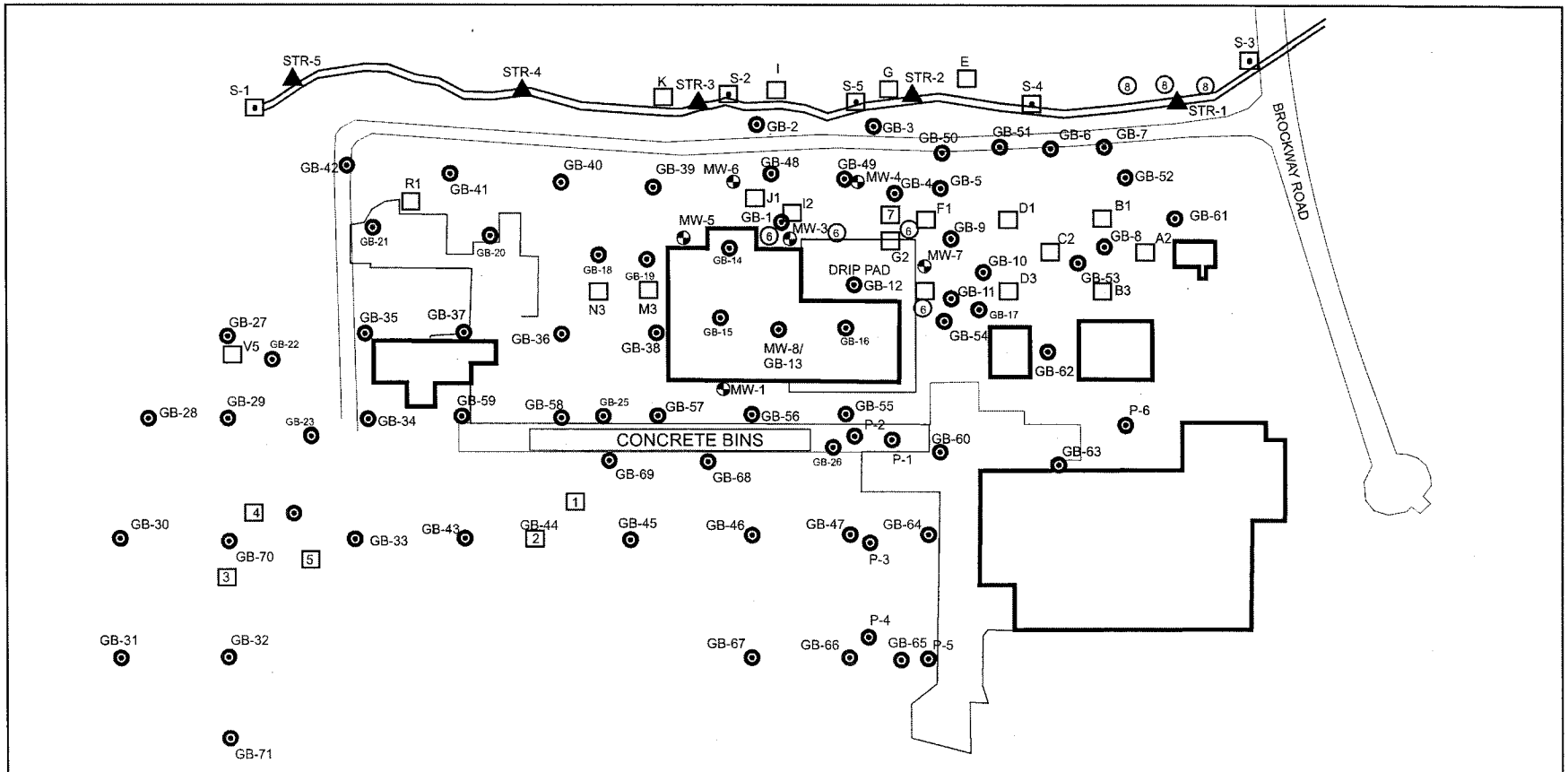
Figure 3		CHELSEA INDUSTRIAL PARK ADJACENT PROPERTY MAP
Prepared By:	DJO 12/01	
Reviewed By:	JAC 12/01	CHELSEA INDUSTRIAL PARK
Revised:	BPG 2/7/05	Town of Fishkill, New York
Approved By:	JAC 2/7/05	CF030290



LEGEND

- STREAM LOCATION
- STREAM WATER SAMPLE LOCATION
- STREAM SEDIMENT SAMPLE LOCATION
- CGC SOIL BORING LOCATION
  GB 1-12 COMPLETED JAN 99'
  GB13-26 COMP. MAY 01'
  GB 27-60 COMP. FEB 02'
  GB 60-71 COMP. APR 02'
- LBG (1987)and DUNN(1989) SOIL SAMPLE LOCATION
- MONITORING WELL LOCATION

0 FEET 200
100

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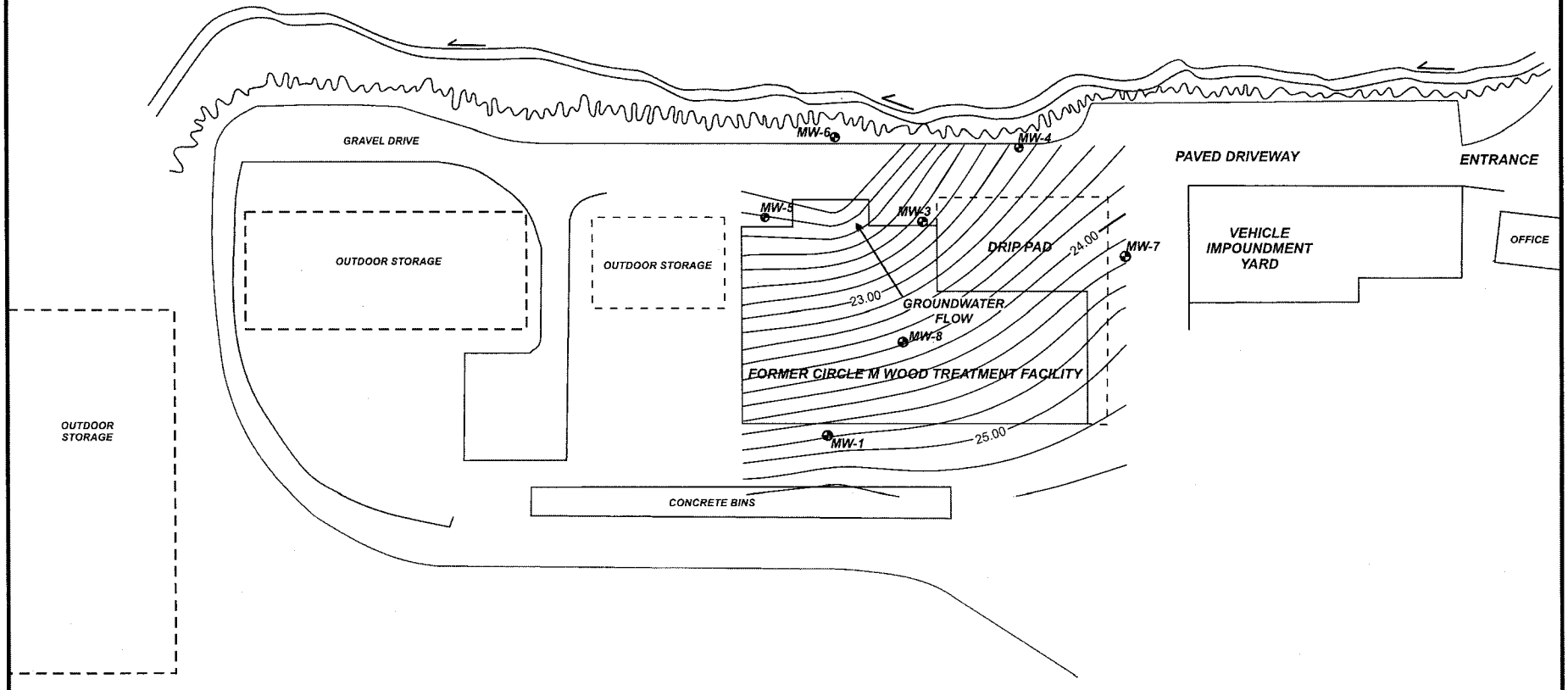
Figure 4	
Prepared By:	DJO 05/16/02
Reviewed By:	JAC 05/16/02
Revised By:	BPG 2/4/05
Approved By:	JAC 2/4/05

MONITORING WELL & SAMPLE LOCATION MAP

CHELSEA INDUSTRIAL PARK
Fishkill, New York
CF030290



LEGEND

GROUNDWATER MONITORING WELL

0 80 160

FEET

Contour Interval = 0.2'
Elevations surveyed relative to local datum.

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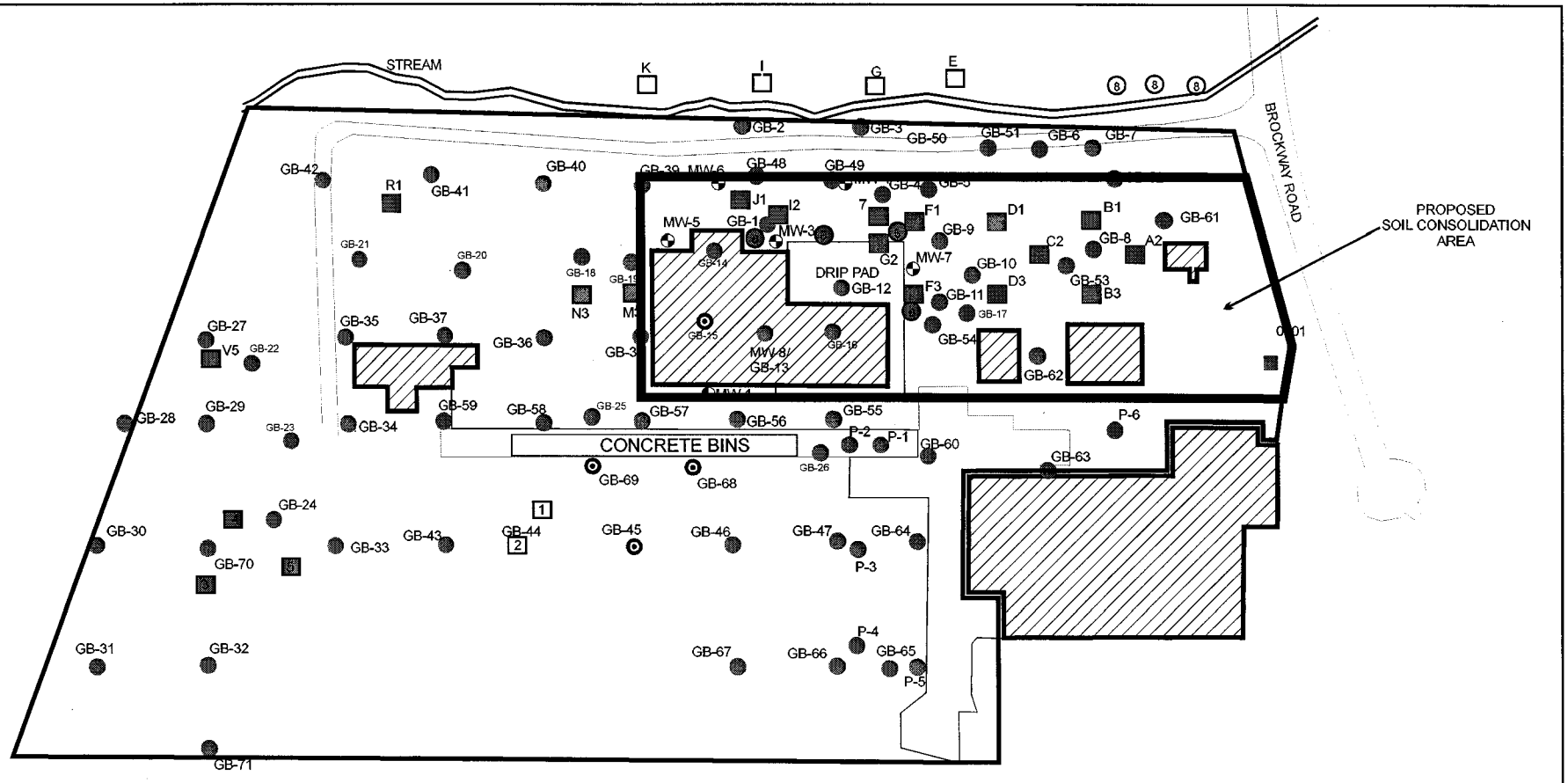
8 Raymond Avenue, Poughkeepsie, New York 12603

N

Figure 5		GROUNDWATER CONTOUR MAP
Prepared By:	CBB 5/98	CHELSEA INDUSTRIAL PARK Fishkill, New York CF030290
Reviewed By:	JAC 5/98	
Revised By:	BPG 2/16/05	
Approved By:	JAC 2/16/05	



LEGEND

- PROPOSED SOIL CONSOLIDATION AREA
- INSTITUTIONAL CONTROL/ASPHALT/ SOIL COVER SITE BOUNDARY
- BUILDING FOOTPRINTS
- SOIL BORING LOCATION (UNCONTAMINATED)
- SOIL BORING LOCATION (CONTAMINATED)
- LBG and DUNN SOIL SAMPLE LOCATION
- MONITORING WELL LOCATION

0 FEET 200
100

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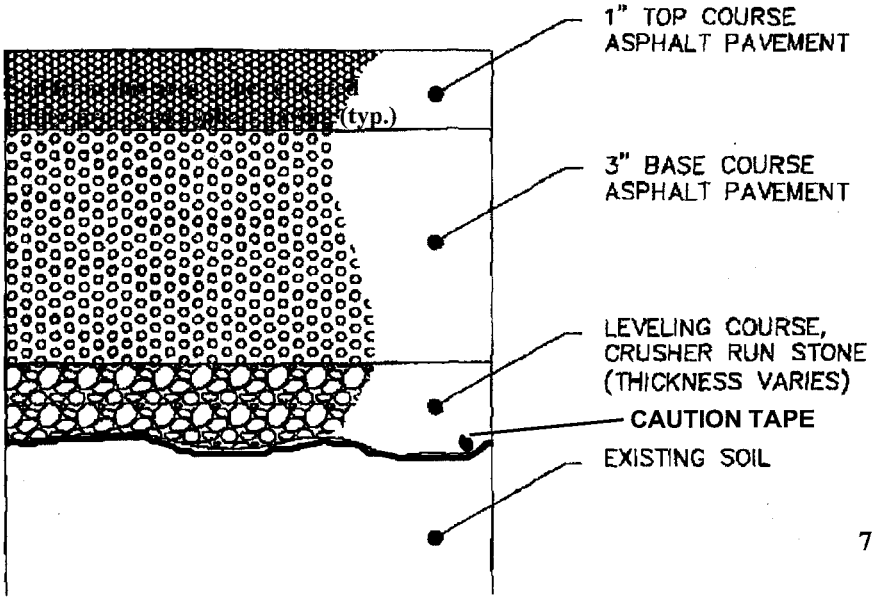
8 Raymond Avenue, Poughkeepsie, New York 12603

Figure 6	
Prepared By:	DJO 05/16/02
Reviewed By:	JAC 05/16/02
Revised By:	BPG 2/18/05
Approved By:	JAC 2/18/05

AREA EXCEEDING 13 PPM FOR ARSENIC AND 25 PPM FOR CHROMIUM AND/OR COPPER

CHELSEA INDUSTRIAL PARK
Fishkill, New York
CF030290



7

NOTES:

- REMOVE VEGETATION, PROOF ROLL EXISTING SOIL SURFACE
- PLACE & COMPACT CRUSHER RUN STONE AS LEVELING COURSE
- **CAUTION TAPE TO BE 2" WIDE, PLACED @ 3' CTRS. BOTHWAYS, AND IMPRINTED WITH THE MESSAGE, "STOP DIGGING. CALL 800-458-1158 FOR INFORMATION. REFERENCE: SITE ID No. 314083" @ 3' CTRS.**

STERLING

Sterling Environmental Engineering, P.C.

One Columbia Circle • Albany, New York 12203

TYPICAL PAVEMENT SECTION

CIRCLE M
WOOD TREATMENT SITE

TOWN OF FISHKILL DUTCHESS COUNTY, N.Y.

PROJ. No.:	21044	DATE:	2/21/03	SCALE:	N.T.S.	DWG. NO.	21044001	FIGURE	7